Space Weather Forecast

Issued on Saturday 11 January 2025 at 13:29 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated Moderate class flares. Chance of G1-G2/Minor-Moderate Geomagnetic Storms this weekend.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low solar activity during the last 24 hours with only Common-class flares, the largest peaking at 10/2246 UTC from the large region in the northwest. There are twelve sunspot regions visible on the Earth-facing disc with the emergence of several small, simple spots in the northwest and also eastern disc during the period. The largest and most magnetically complex sunspot region is located in the northwest disc. it maintains a rather complex magnetic configuration, but there is evidence of decay of some of its interior spots during the period. A smaller sunspot group to the northwest of this group saw some slight decay of its constituent spots. Meanwhile a region in the northeast developed mature lead and trailing spots, but without any notable intermediate spots. The remaining regions on the disc remain small and simple with limited overall change.

A lack of recent SOHO coronagraph imagery, combined with large gaps in STEREO coronagraph imagery has meant that the detection of Coronal Mass Ejections (CMEs) has been more challenging than usual. However, SOHO imagery has recently returned and does not indicate any Earth-directed CMEs during the period.

Solar Wind / Geomagnetic Activity: Solar winds have been slightly elevated throughout the period, varying between 410-490km/s. The Interplanetary Magnetic Field was largely weak, aside from a brief moderate period late in the UTC day on 10 Jan. The north-south component, was largely weak and variable. Geomagnetic activity was generally Quiet to Unsettled (Kp1-3) but with a single Active (Kp4) interval between 10/2100-11/0000 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate, with a high chance of further Moderate flares and a very slight chance of isolated Strong flares, mainly due to the moderately large sunspot region located in the northwest disc.

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Solar Wind / Geomagnetic Activity: A recent lack of coronagraph imagery means that CME analysis has been extremely difficult and comes with significant uncertainty for the forecast period. A possible Earth-directed CME from near the centre disc on 09 Jan may bring some enhanced geomagnetic activity, most likely over the UTC weekend, but is very low confidence in terms of a possible arrival and timings. Solar winds are currently slightly elevated due to the ongoing fast wind from a coronal hole. This is expected to decline by the end of Day 3 (13 Dec) with speeds returning to normal background levels. Fast winds from another coronal hole is expected to bring some minor enhancement from Day 4 (14 Jan).

Geomagnetic activity is expected to be mainly Quiet to Unsettled between Days 1 and 3 (11-13 Jan), but with a chance of G1 to G2 Minor/Moderate Storms on Days 1 and 2 should any CME influence be forthcoming (very low confidence). On Day 4 (14 Jan) activity is expected to increase to Unsettled to Active levels, following the onset of the fast wind from a small coronal hole, with a chance of peak G1/Minor Storm conditions.

Energetic Particles / Solar Radiation: Solar radiation is expected to remain at background levels, with only a slight chance of rising in response to any notable flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	25	30	20	20
Strong	G3	No	5	10	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	50	50	50	50
Very Active	R3-R5 (X Class)	No	5	5	5	5

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	15	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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